No. R. 3812—Agri., dated 18th December 1907.

The accompanying text of leaflet No. 8 of 1907, on "Ensilage for fodder in India" issued by the Bengal Department of Agriculture, is republished for general information.

"Ensilage is the name given to the process of preserving green fodder; a silo is the place in which the process is carried out; silage is the preserved fodder. It is observed that when a crop is cut green and heaped together, chemical changes take place in the plant-tissue and heat is developed. These changes can be summed up in the one word "fermentation." In the fermentation that goes on, the starch, etc., in the cells of the plant give rise to sugars, alcohols, and ultimately volatile organic acids. The sugars impart a sweet taste to the silage, the alcohols a sweet aroma, and the acids a sour taste and smell. Now the fermentation which gives rise only to sugars and alcohols produces sweet silage, while that which goes further, giving rise to much acid produces sour silage. This fermentation can be regulated by controlling the amount of air in the interstices of the mass of fodder. If a green crop be cut at such a time when it is nearly mature and contains about 75 per cent of water, and then stacked in a silo, small quantities being spread out uniformly over the surface and trampled down, the entire mass is consolidated and fermentation starts. But owing to the fact that the mass is so consolidated, there is little air in the interstices, the changes are slow and the temperature does not rise very high or rapidly. If kept below 120°F., acids will be freely formed, and the silage will be "sour." If, on the other hand, the crop be cut and left out in the air to dry a little and then put in the silo, the fermentation will be more rapid, especially if the mass be not so much trampled and consolidated. The result of this is that a high temperature will rapidly be attained, and the cells of the plant-tissue will die.

If when the temperature is about 140°F., the mass is thoroughly pressed, the air will be driven out more or less and the fermentation will be checked and a sweet silage containing sugars and alcohols will be formed. It will not be acid or sour. It is important to watch the temperature, as, if it gets too high, the mass may become charred or burnt, with the result that much of the nutritive constituents will have peen dissipated. Although special temperatures have been mentioned above, in actual practice, experience and not a thermometer will serve as a guide in the process of making silage.

Sour silage is of a light green colour with sour taste and smell. Sweet silage is of a dark brown colour with a pleasant aroma and a sweet taste. Probably the most useful silage is neither sweet nor sour, and is produced when the temperature ranges from 110°F. to 130°F. In silos the lower and more consolidated part of the mass will approximate to the sour, while the upper and the less consolidated will be sweet silage, unless precautions are taken to get a uniform product. If the crop to be made into silage be chaffed to one inch lengths previously, it will help to make the mass more uniform, air will be more easily excluded, because the material will pack tighter, and it will be prevent the outer portions round the sides of the silo becoming mouldy. It will also save the stock some trouble in mastication. The conversion of green fodder into silage is accompanied by some of the indigestible substances becoming digestible.

Simple Silos.

Silage supplies succulent food at a time when succulent crops are not obtainable. Therefore, if a person can make silage for use in such times, his beasts are at an advantage.

(1) A very inexpensive form of silo is the "stack silo" This is made by selecting a dry sheltered spot, not exposed to the prevailing wind. Next the foundation must be well drained so that no water can soak into the place. If a wooden floor can be arranged, so much the better. The fodder is packed on this foundation in the form of a stack; square, oblong or circular stacks may be made. The fodder is pressed down in stacking as much as possible and a uniformly level surface is maintained. As the stack reaches a certain height, it will be found difficult to prevent the sides slipping off. This slipping can be prevented by driving upright poles in the ground around the stack. The fodder should be put on in such quantities as prevent the temperature of the lower bulk becoming too high. If a thermometer is available, a few pieces of wood can be left in the centre in an upright position, so that a hole remains open down the centre, into which the thermometer can be lowered and the temperature taken. Finally, heap up the crown so as to run off any rain water, and press down tightly, and water. If any heavy planks or stones are available, place these on the top.

(2) Another inexpensive form of silo is made by selecting a dry place and digging a hole of sufficient size to contain the required amount of silage. Around the top of this silo, to prevent the earth falling in, etc., place slabs of stone or any other suitable material, and as it were, build up a wall for a foot or two. Around the outside of this "wall" put quantities of mud and earth, thus reducing to a minimum the passage of air and water, from the outside through it. Fill the silo, press down tightly by tramping and water the surface to finish it off and prevent the upper part becoming too hot. The walls of the silo should be as upright and smooth as possible. The structure around the top will serve to keep out flood-water. The silo may either be protected from rain by a tent-roof, or else the silage may be heaped up above ground level, sloping into two directions from the middle, and then covered to a depth of about

six inches with soil, so that if rain falls, it will run off and not sink into the pit. Silage when opened becomes mouldly and bad for food after several hours, therefore it must be fed to stock at once. The silage should be taken out of the silo in layers so that none of it thus exposed to the air has time to go mouldly before being used.

Maize and Juwar.

These are good all-round crops, both bulky and nutritious, but there are many others, *e.g.*, barley, oats, rye, beans, peas, vetches, grasses, etc. Maize should be cut for silage when nearing maturity. The yield of dry matter is then greater and the percentage of water is less; and the silage produced is sweeter. It is best to cut it when the grains in the heads are "glazed." A good maize crop yields at least 12 tons to silage per acre. Juwar yields a more acid and less digestible silage than maize, but still it is quite good. It is best cut when maturity has been attained and the seeds formed, but before they show any signs of ripening. Young juwar should not be employed, as cases of poisoning have been traced to the use of this plant when young."

By Order,

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